May Branch, Fort Smith, Arkansas
Flood Damage Reduction
Feasibility Report Summary
September 2006
S&A Review Summary Updated December 2006

STUDY INFORMATION

Study Authority. The May Branch Feasibility Study was conducted under the authority of a March 11, 1982, resolution of the Committee on Public Works and Transportation of the United States House of Representatives. The resolution reads as follows:

RESOLVED BY THE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION OF THE HOUSE OF REPRESENTATIVES, UNITED STATES, that the Board of Engineers for Rivers and Harbors, established by Section 3 of the River and Harbor Act approved June 13, 1902, is hereby requested to review in cooperation with the States of Arkansas and Oklahoma, political subdivisions, agencies and instrumentalities thereof, and appropriate Federal agencies as a shared effort, the report of the Chief of Engineers on the Arkansas River and tributaries, published as House Document No. 308, seventy-fourth Congress, and other pertinent reports, with a view to determining whether any modification of the recommendations contained therein are advisable at this time, with particular reference to developing an implementable plan for storage, conservation, treatment, and conveyance of water in the Arkansas River and tributaries in Arkansas and Oklahoma, for municipal, industrial, and agricultural uses and other purposes. This study should include an assessment of the usability of the water for various uses.

Study Sponsor. The City of Fort Smith, Arkansas in the non-Federal study sponsor.

Study Purpose and Scope. The May Branch, Fort Smith, Arkansas feasibility report is an interim response to the study authority. The feasibility study report identifies, evaluates, and recommends an appropriate, coordinated, implementable solution to reduce residential, commercial, and industrial flood damages along May Branch in Fort Smith, Arkansas.

Project Location/Congressional District. May Branch, a small urban tributary to the Arkansas River, is located in northwest Arkansas near the Oklahoma border. The stream lies entirely within the city limits of Fort Smith, Sebastian County, Arkansas. May Branch originates in the south central section of the city just south of Rogers Avenue and flows to the north and northwest to the Arkansas River. The study reach is from the confluence of May Branch with the Arkansas River upstream to Park Avenue, approximately 3 miles. The vicinity map and study area is shown on Plate 1. The Congressional district includes Arkansas Senators Lincoln and Pryor and Congressman Boozman, AR-3.

Prior Reports and Existing Water Projects. The following is a partial list of the previous studies, reports and projects in the vicinity of May Branch in the Fort Smith, Arkansas, area.

- Arkansas River Wetlands and Flood Control Reconnaissance Report dated October 1992. The flood damage reduction portion the report was certified 2 August 1993 with the feasibility report to proceed under the title May Branch, Fort Smith, Arkansas.

- Flood Insurance Study, Fort Smith, Arkansas, dated July 1991.

- Survey Report, Arkansas River vicinity of Fort Smith-Van Buren, Arkansas, March 1987.

- Engineering Study, Drainage Facilities – "P" Street Combined Sewer, Fort Smith.

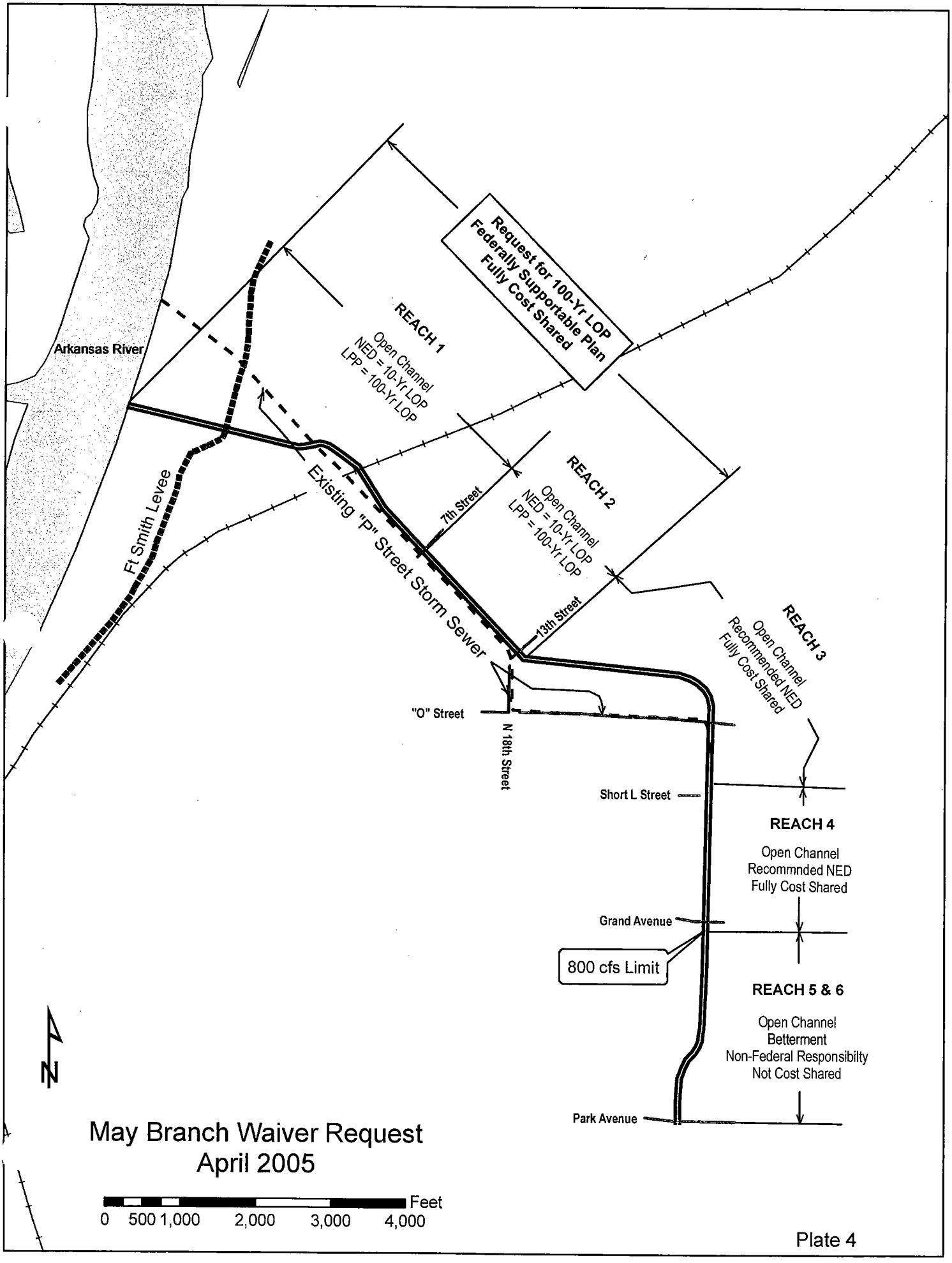
- Arkansas, Mickle Associates, dated August 1970.

- McClellan-Kerr Arkansas River Navigation System (MKARNS). This is a multipurpose project that provides for commercial navigation, flood damage reduction, hydropower, water supply, channel stabilization, fish and wildlife conservation, and recreation. Commercial navigation extends from the port of Catoosa, Oklahoma, to the Mississippi River. The first cargoes reached Fort Smith, Arkansas, in 1970. Thirty (30) upstream reservoirs of the MKARNS provide flood damage reduction.

- Fort Smith Levee and Floodwall. This Federally constructed local flood protection project consists of an earthen levee, concrete floodwall, four drainage structures and two pumping stations (including the P Street Pump Station) along the Arkansas River at Fort Smith. The project was completed in 1951 and is operated and maintained by the city of Fort Smith.

- P Street Storm Sewer. In 1910, local interests replaced the original open channel of May Branch, from Park Avenue to the outfall at the Fort Smith Levee P Street Pump Station, with a 2.7-mile long underground culvert system. The limited capacity of this major drainage system is the focus of the current feasibility study.

Federal Interest. In urban and urbanizing areas provision of a basic drainage system to collect and convey local runoff is a non-Federal responsibility. However, water damage problems may be addressed, under Federal flood damage reduction authorities, downstream from the point where the flood discharge is greater than 800 cubic feet per second (cfs) for the 10-percent chance flood (one chance in ten of being equaled or exceeded in any given year) under conditions expected to prevail during the period of analysis. It is in the Federal interest to implement a plan to reduce food damages along May Branch. The limit of Federal interest is just upstream of Grand Avenue where the 10-percent chance flood flow equals 800 cfs. The recommended plan, the Locally Preferred Plan (LPP), is economically justified with estimated equivalent annual costs of $1,590,000, including OMRR&R costs estimated as $65,000. The equivalent annual flood damage reduction benefits are estimated to be $1,720,000. The indicated ratio of benefits-to-costs is 1.09 to 1. Project implementation would remove 127 structures from



May Branch Waiver Request
April 2005

Plate 4

the 100-year flood plain. Consequently, the project has the potential to reduce future net Federally-subsidized reimbursements for flood losses.

STUDY OBJECTIVES

Problems and Opportunities. The principal water resources problems in the May Branch Basin are flood damages to industry, businesses, and residences, and limited aquatic habitat.

1) Flood Damage Reduction - Typically, for small basins like the May Branch basin, flooding is flashy and of short duration. The P Street storm sewer is the major drainage outlet for the May Branch basin. Runoff from the 5.3-square mile drainage area of May Branch frequently exceeds the capacity of this major drainage outlet. Currently, expected annual flood damages along May Branch are estimated as $1.7 million. There are 136 structures located in the May Branch 500-year floodplain. The value of the structures and contents is estimated at $44.2 million. Inadequately sized storm sewer inlets cause localized water ponding problems. This ponded water remains in the streets until the storm sewer can pass the water. Several major thoroughfares transverse the floodplain including Midland Blvd (Average Daily Traffic, ADT, in 2000 of 9,700), O Street (ADT-10,300), and Grand Avenue (ADT-17,000) that are subject to flooding by the 100-year event.

Runoff in excess of the sewer capacity flows overland and along the streets following the general alignment of the P Street Storm Sewer. At the point where the storm sewer intersects the three main line railroad tracks, runoff ponds up until it overtops the railroad embankment. The floodwaters then pond behind the Fort Smith Levee until evacuated through the levee outlet into the Arkansas River. Flow at the outlet is normally by gravity; however, when the river is high, the pumps are activated.

Hydrologic analyses indicate that runoff from a storm event with a recurrence interval of approximately ten years will exceed the storm sewer capacity. However, there are significant flood damages in the upper three reaches of May Branch with a 5-year recurrence interval storm. A major flood event occurred in spring 1990. At that time, the Arkansas River experienced high flows and the P Street gravity outlet on May Branch was closed. Pumping and the P Street storm sewer could not handle the flow. The heavy rainfall resulted in flooding that caused major property damage. An estimated $2.5 million in damages occurred to 26 businesses and 44 residential units. An estimated 180 people reside within the 500-year flood plain. The opportunity exists to improve the social well being of those who live and work in the May Branch floodplain by alleviating the flood damages to the homes, businesses, and infrastructure.

2) Ecosystem Restoration - Tunneling the lower two thirds of the May Branch channel into the P Street storm sewer around 1910 reduced to virtually nonexistent, the aquatic habitat existing along May Branch when it was an open channel. The opportunity exists to reconstruct the May Branch channel, which would restore some minor aquatic habitat.

Planning Objectives. The study is to develop measures to alleviate the flooding along May Branch. The National Economic Development plan is to be defined while preserving the environment and promoting social well-being. The project's baseline cost estimate and schedule

will be established. Based on previous studies several alternative plans were eliminated from consideration. Thus, the study focus is to determine the location, length, and width of channel plans; and determine whether additional pump capacity is justified. The City of Fort Smith chooses not to develop ecosystem restoration or recreation features at this time. The planning process is intended to develop alternatives that:

a. Reduce flood damages in the May Branch Basin over the period of analysis.

b. Increase aquatic habitat along May Branch.

c. Reduce flood related transportation interruptions

Planning Constraints. The identified planning constraints are as follows:

a. Maintain the flood protection provided by the Fort Smith Levee and P Street Pump Station.

b. Avoid potential contamination sites.

c. Minimize structure and infrastructure relocations

d. Adhere to the open space criteria for flood reduction measures on lands acquired under Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program.

e. Limit flood damage reduction solutions with full Federal cost-sharing participation to downstream of the point where the 10 percent chance discharge is greater than 800 cubic feet per second.

f. Avoid disturbance of wetlands.

g. Do not permanently interrupt railroad spur service to the Kansas City Southern track immediately east of the Fort Smith Levee/Floodwall.

ALTERNATIVES

Plan Formulation Rationale. Plans were formulated to achieve the identified planning objectives while avoiding the constraints. Preliminary management measures were screened to determine which plans should be developed further based on their relative efficiency in providing the desired water management improvement objectives. Final alternatives were compared and effective plans were selected and optimized to determine the NED plan and Locally Preferred Plan (LPP).

Management Measures and Alternative Plans. The following management measures in were investigated as part of the study:

a. No Action – This alternative maintains existing conditions as the future without project condition. Benefits from all the plans are compared against this no action plan. The May Branch basin is considered 100 percent urbanized; thus, there is little opportunity for development and no increases in runoff rates are anticipated. Frequent flooding will continue to cause appreciable damage along May Branch. Conveyance systems in the lower two-thirds of the basin consist of curbs, gutters, and storm sewers that provide no aquatic habitat. The P Street storm sewer would serve as the major outlet for the May Branch basin. Street intersections would act as detention basins after curb inlets and drop inlets have reached capacity. Excess runoff would flow between buildings and across low-lying lands along North P Street. Runoff following a storm event having a 10 percent chance of occurring in any given year would exceed the capacity of the storm sewer system. The Fort Smith Levee/Floodwall with the P Street pump station would protect lower portions of the basin from high stages on the Arkansas River. The P Street storm sewer terminates at the P Street pump station. It is a five-pump system with a design capacity of 400 cfs. If runoff exceeds the pumps' capacity, the excess would flow into the sump area located between the pump station and the railroad tracks on 4th Street.

The P Street storm sewer surfaces in the sump at the overflow weir approximately 1,000 feet upstream of the pump station. The sump area has a limited capacity to store the May Branch runoff until the Arkansas River recedes or until the pump station can evacuate the ponded waters. The no action alternative would leave 72 homes and 64 commercial and industrial establishments, at $44.2 million, subject to flooding in the 500-year floodplain. To limit flood damages to no more than the estimated existing annual damages of $1.7 million, the City of Fort Smith would continue to operate and maintain the P Street pump station. It would also rehabilitate and maintain the P Street storm sewer to preserve its capability to contain up to the 10-year flood event.

b. Non-Structural – Relocating structures out of the flood plain.

c. Structural – Constructing detention ponds, reconstructing open channels, placing culverts or bridges at rail and road crossings, building new pump stations, and constructing new tunnels.

Five preliminary plans were investigated: detention ponds, a parallel storm sewer, additional pump capacity, nonstructural measures, and relief openings through the Arkansas River Levee and railroad tracks with a connecting channel. The first three plans were formulated to address the inability of runoff to pass beyond the railroad embankments near 4th and P streets and the limited capacity of the 12-foot diameter outlet through the levee.

(1) Detention basins plan – Two detention basins were designed to provide a total storage of 311 acre-feet. The flood damage reduction that would be obtained using these detention basins was estimated to be negligible.

(2) Relief openings - This plan consists of constructing three 6-foot diameter culverts through the three railroad embankments at river mile 0.672 and placing an additional gated outlet structure in the levee in the downstream reach. These openings would be connected with a 50-foot bottom width channel. The culverts would be designed to alleviate the flooding caused by runoff in excess of the storm sewer capacity backing into the surrounding area. The levee

outlet would increase the flow capacity at the Arkansas River Levee and reduce ponding landward of the levee. This plan would reduce total damages by only about 51 percent, as the upstream three reaches would receive little to no reduction in damages. The plan was economically justified based on the hydraulic analysis used in the reconnaissance phase. However, current analysis resulted in costs exceeding the benefits. This eliminated the alternative from further consideration as a stand-alone plan. However, the features of this plan were used as a basis for formulating the new open channel plan alternatives.

(3) Parallel storm sewer - Mickle Associates studied parallel storm sewers from North 18th and O Streets to the P Street pump station. The storm sewer would consist of a double 11-foot by 12-foot 6-inch concrete box culvert with a capacity of 3,900 cfs. The cost was estimated as $4,025,000 (1970 prices). This plan would have the same excavation costs, footprint, and relocation considerations as an open channel. However, this plan would be more costly than an open rip-rapped channel and with no additional flood damage reduction benefits. Consequently, the covered storm sewer plan was not investigated further.

(4) Nonstructural plans – Conditions changed from the reconnaissance to the feasibility phase. In 1996, a tornado destroyed businesses that were not reconstructed in the downstream portion of the May Branch corridor. As a result of the tornado, FEMA provided Flood Hazard Reduction Grants to voluntarily remove properties out of the May Branch 100-year flood plain. Nineteen property owners accepted offers from the City of Fort Smith to relocate. Thus, the only acceptable nonstructural relocation measure has already been accomplished. Because of insufficient flood warning times, effective flood-proofing measures could not be implemented to prevent flood damages. The small size of the May Branch basin causes flooding to be flashy and of short duration. Because of the short time interval before floodwaters peak, sufficiently advanced flood warnings could not be provided to implement effective flood damage reduction measures. The only practical traffic warning would be signage at each road crossing advising of flood danger.

(5) Additional Pump Capacity – The hydrology and hydraulics analysis, which changed for the feasibility phase, indicated that additional pump capacity is not required.

Final Array of Alternatives. The final array of plans involved reconstructing (day lighting) the May Branch channel from the Arkansas River upstream to Park Street. With these alternatives, openings through the railroad embankments and the Arkansas River Levee, as well as, street crossings would have to be provided. Six downstream alignments, A1, A2, B1, B2, C1, and C2 and two upstream alignment choices, D1 and D2 were developed. These alignments were all assumed to have the same flow capacity characteristics. Each of the six downstream alignments was combined with the upstream alignments to form 12 alignment alternatives. Channel excavation quantities, land requirements including mitigation, and utilities, roads, bridges, culverts, and building relocations were cost estimated.

Comparison of Alternatives. Each of the 12 alignment alternatives will require business and residence relocations, the alternative C1/D1 alignment would require the least number of structure relocations, four business and 11 residences, with four of these structures currently vacant. A total of approximately 6 acres of wetlands were found within the overall project area.

The A alignments would cause the greatest wetland impacts and C alignments would not impact wetlands. For all of the alignments investigated, impacts to fish and wildlife resources would be minimal. Each alternative would provide the same level of flood damage reduction and would have very similar social effects over the no action plan. The reduced flooding would improve public health and safety. People could more easily escape from the floodwaters. Threat of flooding the city sewage treatment plant would be reduced. The project corridor would increase open space in the project area.

The project would reduce periodic traffic interruption, since the major streets and railroads would be flooded less frequently. Not every street would continue across the new open channel; thus slightly increasing travel distances. The plan alignments have few minor or temporary environmental impacts compared to the no build alternative. The NED objective of reducing flood damages would be met by re-establishing an open channel that also would provide some minor increase in environmental quality. The lowest differential cost routes, Alignment C1 and Alignment D1, were combined to make the selected alignment. Route C1/D1 would have the lowest cost, the least number of structure relocations, and the fewest environmental impacts. The routes are shown on the attached Plate 1.

To optimize the alternatives for the C1/D1 alignment, three channel plans were formulated--the 10-year, 50-year, and 100-year flood discharge capacity plans. These plans were developed such that generally the start of flooding damage would not occur until flood flows greater than the named event occurred. All three of the plans would have a gated control structure consisting of three 10-foot by 10-foot culverts at the Arkansas River levee and an open channel extending upstream to Grand Avenue. At Grand Avenue (the upstream limit of Federal interest), the channel would be about 9-feet deep. The channel would be approximately 17 feet deep at the Arkansas River levee. These plans would incorporate a length of the drain from short L to 13th Street as a collector drain and would maintain the segment from the P Street overflow weir to the P Street Pump Station for use when the gated structure is closed. No plan from this array was determined to be economically justified.

Four more plans were formulated: C-10, C-50, C-100, and C-200 to contain the 10-year, 50-year, 100-year, and 200-year floods within the new open channel. However, in addition to the new open channel, these plans also incorporate the flow capacity of the existing P Street Storm Drain from short L Street to the P Street pump station for the downstream three reaches. The NED plan was identified, and the LPP selected, from this final array of optimized plans.

Key Assumptions. The study area was determined to be fully urbanized. The existing condition damages excluded damages to structures removed from the floodplain under the FEMA Hazard Mitigation Grant Program. New structures will not be constructed on these lands. It was assumed that there would be limited additional development in the study area. The city will continue to operate, maintain, repair, replace, and rehabilitate the P Street Storm Drain except in Reach 4 (and 5 & 6) where the drain will be replaced with the a new open channel.

Recommended Plan. The Proposed Action Plan, the Locally Preferred Plan, consists of an open channel that would extend for 2.25 miles from the Arkansas River upstream to Grand Avenue, Reaches 1 through 4. An extension of the channel, Reaches 5 and 6, would add 0.5 miles to Park

Street. From O Street to the Fort Smith (Arkansas River) Levee, the new open channel would augment the flow capacity of the P Street Storm Sewer. There would be covered channel sections at road (except for three road bridges) and railroad crossings and a gated control structure through the levee at the Arkansas River. The channel bottom width varies from 24 feet in the downstream portion to 4 feet for the upstream most 0.5 miles. The channel would be mainly trapezoidal with three horizontal to one vertical (3H:1V) side slopes. The channel slopes would be rip-rapped, except for a short vertical concrete wall section, and a 1,500-foot long segment downstream of Grand Avenue where the channel has 2H:1V concrete-lined side slopes to avoid area buildings. Fifteen (15) structure relocations will be required. The plan includes provision of relocation assistance payments in accordance with requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646).

The LPP meets the needs of the local community. At about 78.6 percent additional cost greater than the National Economic Development (NED) plan, the LPP plan provides greater flood reduction benefits and removes the maximum number of structures from the 100-year floodplain, (126 structures versus the 87 structures for the NED plan). The LPP is economically justified without significant adverse impact to the environment.

Systems/Watershed Context. The May Branch watershed is a fully developed urban area with its outlet to the Arkansas River confined to an underground storm drain culvert that does not have other watershed purposes. The reconstruction of an open channel would provide some minor aquatic habitat restoration and would have no adverse impact to navigation on the Arkansas River. The US Fish and Wildlife Service provided a coordination act report with input provided by the Arkansas Game and Fish Commission. The Arkansas Department of Environmental Quality reviewed the Hazardous, Toxic, and Radiological Waste (HTRW) investigations report. Other agency coordination includes the Natural Resources Conservation Service, the Arkansas Natural Heritage Commission, the State Historic Preservation Office, and the Arkansas-Missouri, Kansas City Southern, Union Pacific, and Fort Smith Railroad companies.

Environmental Operating Principles. Short-term, there will be temporary and minor construction impacts associated with increased noise and dust. Longer term, the project will reduce human suffering from flooding along May Branch. This information was shared with the public and other agencies to solicit their comments. Reestablishing an open channel will sustain and support the viability of a minor aquatic ecosystem.

Independent Technical Review (ITR). All substantive concerns of the ITR have been considered and resolved. The ITR was certified in July 2006. In 1999, existing conditions were reviewed by independent reviewers and responses to comments were accepted. ITR of the preliminary draft feasibility report was certified in August 2004. This ITR had a substantive comment to review the coincident flooding analysis, which was subsequently completed to the reviewer's satisfaction. The August 2004 ITR was followed by the satisfactory completion of ITR of the economic analysis by Galveston District. ITR of the Real Estate Plan was concluded in July 2006 by Tulsa District after an Attorney Opinion of Compensability was signed. The Legal Review of the Environmental Assessment (EA) was completed in April 2006 after the

report was revised to highlight the No Action Plan and to appropriately address the environmental justice concerns with regard to residential relocations in low income communities.

EXPECTED PROJECT PERFORMANCE

Project Performance. Project implementation could eliminate approximately $1.7 million in expected annual flood damages within reaches 1 through 4. This would constitute about a 96-percent reduction expected damages along this portion of the stream corridor. Residual flood damages would still be expected to occur in reaches 5 and 6. With project implementation 127 structures would no longer be located within the 100-year flood plain. Consequently, the project has the potential to reduce future net Federally-subsidized reimbursements for flood losses. The recommended LPP would nearly eliminate the flood damages expected to be caused by a flood that has a 1.0-percent chance of occurring in any given year (100-year event). The recommended plan would also diminish flood damages for events larger than the 1.0-percent chance event by decreasing flood stages and increasing the chances of successful emergency flood fighting. The project would also reduce highway and railroad traffic interruptions, lessen flood-induced disruptions to the delivery of health and safety services, and decrease the threat of loss of life attendant to flash flooding in urban settings.

Project Costs. At October 2005 price levels, reaches 1 through 4 of the LPP have an estimated construction cost of $25,403,000. The cost of flood damage reduction features in reaches 5 and 6 of the LPP are 100-percent non-Federal costs and are not included in the economic evaluation. The cost of flood damage reduction features in reaches 5 and 6 of the LPP is estimated at$5,082,000. The total cost of the cost shared (1 through 4) and non-cost shared (5 and 6) reaches of the LPP is estimated as $30,485,000

TABLE 1

PROJECT FIRST COSTS (Reaches 1– 4)
MAY BRANCH, FORT SMITH, ARKANSAS
October 2005 Price Levels

Construction Item	Cost
Lands and Damages	$ 3,441,400
Relocations	4,943,600
Channel Improvements	12,564,000
Hydraulic Control Structure	572,000
Engineering and Design	2,042,700
Construction Management	1,839,300
Total Project Construction Cost	$ 25,403,00

TABLE 2

APPORTIONMENT OF TOTAL PROJECT COSTS FOR THE LPP
MAY BRANCH, FORT SMITH, ARKANSAS
October 2005 Price Levels

Reaches 1 - 4	FEDERAL	NON-FEDERAL	TOTAL
Lands and Damages	$144,700	$3,296,700	$3,441,400
Relocations	-	4,943,600	4,943,600
Channel	12,564,000	-	12,564,000
Hydraulic Control Structure	572,000	-	572,000
Engineering and Design	1,484,200	558,500	2,042,700
Construction Management	1,336,300	503,000	1,839,300
5% Cash Contribution	(1,270,200)	1,270,200	-
Total First Cost, Reaches 1 - 4	$14,831,000	$10,572,000	$25,403,000
Reaches 5 & 6			
Lands and Damages	$ -	$2,000,000	$2,000,000
Construction	-	3,082,000	3,082,000
Total, Reaches 5& 6	$ -	$5,082,000	$5,082,000
Total First Cost	$14,831,000	$15,654,000	$30,485,000
Percent of First Cost, Reaches 1 - 6	49%	51%	100%

Equivalent Annual Costs and Benefits. Table 3 provides equivalent annual benefits, costs, and benefit-cost ratios are shown for the LPP. A comparison of economic data for the NED Plan and the LPP is shown in Table 4.

TABLE 3
EQUIVALENT ANNUAL BENEFITS AND COSTS, LPP
MAY BRANCH, FORT SMITH, ARKANSAS
(October 2005 Price Level, 50-Year Period of Analysis, 5.125% Discount Rate, 3.8 year Construction Period)

	Reach 1	Reach 2	Reach 3	Reach 4	Reaches 1-4
Investment Costs:					
Project Construction Costs[1/]	$12,272,600	$4,723,800	4,438,000	3,378,700	$24,813,100
Interest During Construction	1,214,700	467,600	439,300	334,400	2,456,000
Total Investment Cost	$13,487,300	$5,191,400	$4,877,300	$3,713,100	$27,269,100
Average Annual Costs:					
Interest	691,200	266,100	250,000	190,300	1,397,500
Amortization	61,900	23,800	22,400	17,000	125,100
OMRR&R	32,300	9,400	14,100	9,400	65,200
Total Average Annual Costs	$785,400	$299,300	$286,500	$216,700	$1,587,800
Average Annual NED Benefits:					
Flood damage	$114,900	$400,600	$548,600	$302,700	$1,366,800
Emergency, Non Phys, & Utility	25,800	80,200	89,600	73,800	269,400
Auto damages	4,300	15,700	13,100	25,900	59,000
Flood Insurance	3,400	4,300	2,500	4,900	15,100
P St Sewer repair savings	0	0	0	13,000	13,000
Total Average Annual Benefits	$148,400	$500,800	$653,800	$420,300	$1,723,300
Net Annual Benefits	($637,000)	$201,500	$367,300	$203,600	$135,500
FDR Benefit/Cost Ratio	0.19	1.7	2.3	1.9	1.09
FDR Benefit/Cost Ratio at 7%[2]					.82 to 1

[1/] Excludes $589,900 in relocation assistance payments
[2] Per Executive Order 12893

TABLE 4
NED PLAN / LPP COMPARISON
(October 2005 Price Level, 50-Year Period of Analysis, 5.125% Discount Rate)

Item	NED Plan	LPP
Project First Cost	$23,446,400	$25,403,100
Less Relocation Assistance Costs	(589,900)	(589,900)
IDC	2,005,000	2,456,000
Total Investment Cost	24,861,500	27,269,100
Interest and Amortization	1,388,300	1,522,600
OMRR&R	55,200	65,200
Total Equivalent Annual Costs	1,443,500	1,587,800
Total Average Annual Benefits	1,696,000	1,723,300
Equivalent Annual Net Benefits	253,000	135,500
Benefit/Cost Ratio	1.17 to 1	1.09 to 1

The features of the National Economic Development (NED) Plan are, in all material respects, identical to those of Reaches 1 through 4 of the LPP, except that the NED plan would have smaller channel dimensions in Reaches 1 and 2 nearest the Arkansas River. Implementing the NED plan would be approximately $1,957,000 less costly than the LPP. However, the LPP would provide greater flood damage reduction and less expected residual flood damages compared to the NED Plan. The Assistant Secretary of the Army (Civil Works), by memorandum dated 27 October 2005, granted an exception to the Administration policy requirement that the NED plan be recommended for implementation.

Cost Sharing. In accordance with the Water Resources Development Act (WRDA) of 1986, as amended, the City of Fort Smith, Arkansas, the non-Federal sponsor, will provide a minimum of 35 percent, but not more than 50 percent of the project costs for reaches 1 through 4. Five percent of total project costs for reaches 1 through 4 must be provided in cash. Additionally, the City of Fort Smith will provide all lands, easements, rights-of-way, relocations, and suitable borrow and excavated material disposal areas. The city is solely responsible for all costs associated with construction in reaches 5 and 6 of the project.

Federal participation in cost sharing is limited to flood damage reduction features in reaches 1 through 4. The cost of features in reaches 1 through 4 is estimated as $25,403,000 at the October 2005 price level. The non-Federal sponsor will receive credit for lands, easements, rights-of-

way, relocations, and disposal areas in reaches 1 through 4 valued at $9,302,000. These costs include $589,900 for relocation assistance payments. The 5-percent minimum non-Federal cash contribution for reaches 1 through 4 is estimated as $1,270,000. The total non-Federal share for reaches 1 through 4 is $10,572,000 (41.6 percent). The Federal share is estimated as $14,831,000 (58.4-percent). The costs for the flood damage reduction features of reaches 5 and 6 are a 100 percent non-Federal. The cost of this work is estimated as $5,082,000. The total cost of the recommended LPP (reaches 1 through 6) is estimated as $30,485,000 at the October 2005 price level. The total non-Federal cost for the cost shared (1 through 4) and non-cost shared (5 and 6) reaches is estimated as $15,654,000.

Project Implementation. The City of Fort Smith, Arkansas is the non-Federal sponsor and has budgeted for the project. The local cooperation requirements would be funded through the city's one-cent sales tax, Capital Improvements Program, which generates revenues of over $15 million per year.

Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R). The non-Federal sponsor would be responsible for the project OMRR&R and its estimated equivalent annual cost of $65,200. Items include annual inspection and repair of the channel bottom, side slopes, and the concrete structures. Semi-annually, the slide gates are to be inspected, lubricated, and operated. Debris will be removed. The earthen side slopes above the rip-rapped area are to be mowed four times per year and woody growth removed by herbicides or cutting. Damaged sections of the riprap are to be replaced and plant growth within the riprap is to be removed.

Key Social and Environmental Factors. The plan has minimal cumulative impacts for any reasonably foreseeable action in the project area. The proposed action plan would have the least number of building relocations at 15, with the other plans requiring from 17 to 25 relocations. The relatively small number of residential relocations required for the project in the minority and low-income communities is the most cost-effective method of addressing the risk of flood damages to these residents. Concurrently, the May Branch project will reduce flooding and improve the environment for other residents of these minority and low-income communities outside the footprint of the channel alignment. No wetlands would be disturbed by this action.

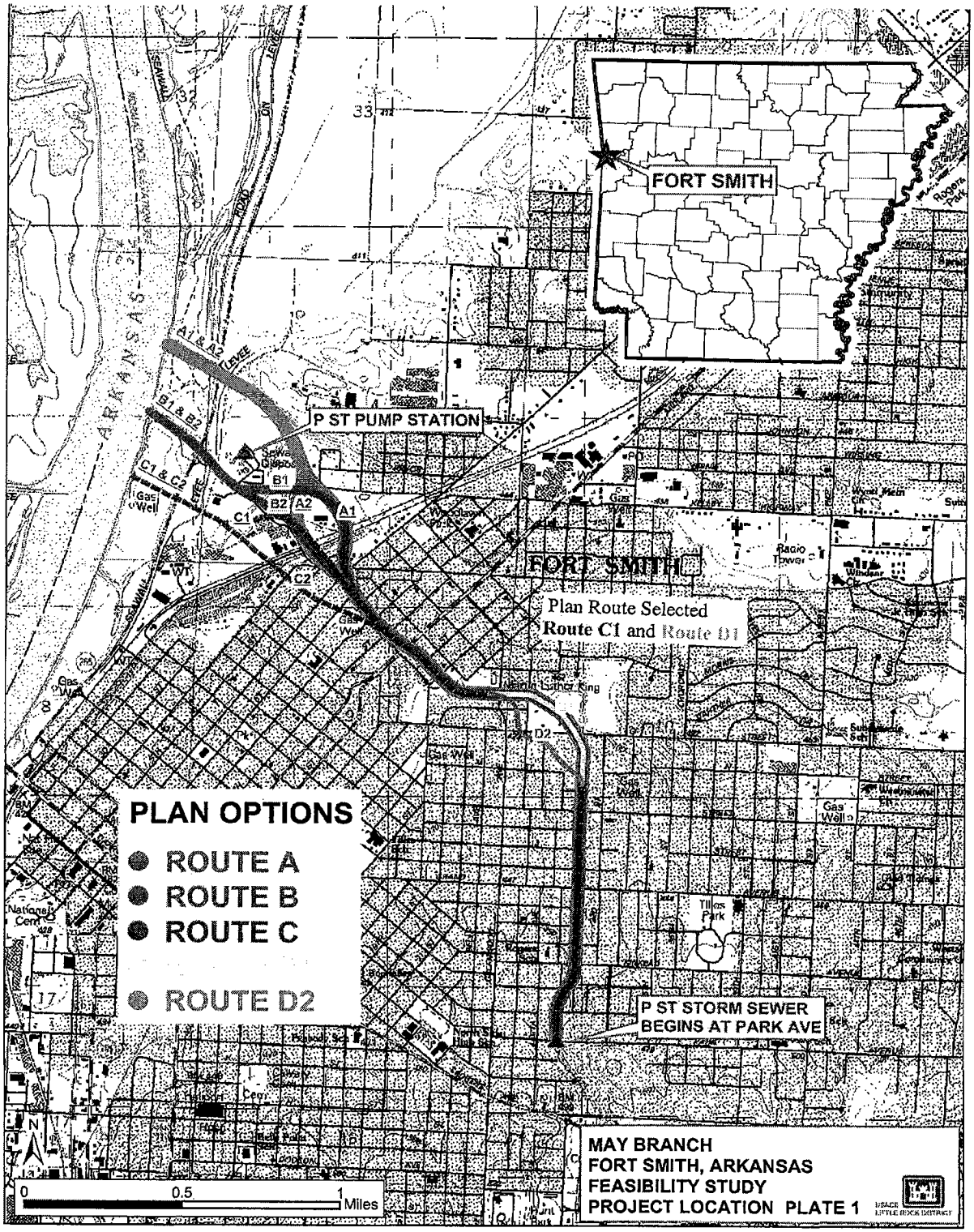
Stakeholder Perspectives and Differences. A public workshop was held in March 1999. The draft report was released for a 30-day public review on 28 July 2006. The public review was completed on 6 September 2006. Comments received were favorable.

Status of National Environmental Policy Act (NEPA) Document. The reporting officers completed an Environmental Assessment (EA) to address potential impacts associated with the project proposal. The impacts identified in the EA have been thoroughly discussed and assessed in the feasibility report. No impacts identified in the EA would cause significant adverse effects to the human environment. Based on the analysis presented in the EA and comments received from a 30-day public review that began on July 28, 2006 and ended on September 6, 2006, the reporting officers determined that preparation of an Environmental Impact Statement, as required by the National Environmental Policy Act is unwarranted and a *Finding of No Significant Impact* (FONSI) is appropriate. The District Engineer, Little Rock signed the FONSI for the May Branch project proposal on September 20 2006.

Response to State and Agency Review. The state and agency review period began on October 27, 2006 and was completed December 8, 2006.

State of Arkansas. The Arkansas State Clearinghouse for Federal Programs responded by letter dated November 27, 2006. This letter transmitted comments from the Arkansas Technical Review Committee which represent the position of the State of Arkansas. The Technical Review Committee supports the proposed project. The Arkansas Geological Commission noted the following: "Most of the proposed construction area lies on Quaternary terrace deposits east of the railroad tracks. These terrace deposits are covering a possible normal fault that the May Branch crosses at Grand Avenue and also again near the center of section 9, T. 8 N., R. 32 W. This fault occurs in the McAlester Formation and would produce fault gouge that could be encountered during construction. The downthrown side of this fault is on the north side." The letter has been forwarded to Little Rock District for consideration during the preconstruction engineering and design phase of project implementation.

Federal Agencies. The US Department of Transportation and the Federal Emergency Management Agency responded by telephone without comments on November 29, 2006. The US Department of Interior responded with no comment by electronic mail on November 30. The Environmental Protection Agency responded by telephone without comment on December 8, 2006.


FORT SMITH
P ST PUMP STATION
FORT SMITH
Plan Route Selected
Route C1 and Route D1
PLAN OPTIONS
ROUTE A
ROUTE B
ROUTE C
ROUTE D2
P ST STORM SEWER
BEGINS AT PARK AVE
MAY BRANCH
FORT SMITH, ARKANSAS
FEASIBILITY STUDY
PROJECT LOCATION PLATE 1
0
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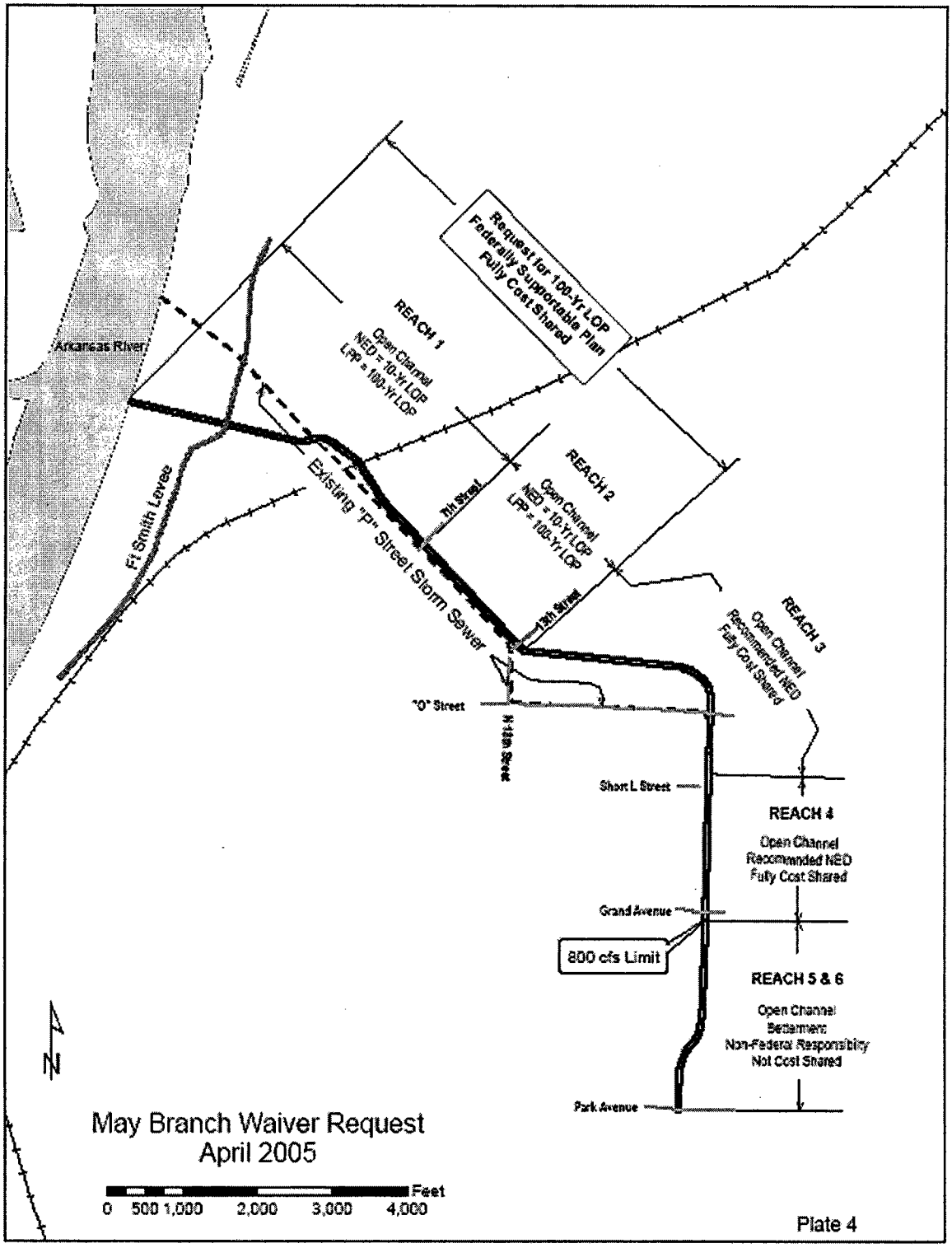
1
Miles


Arkansas River
Request for 100-Yr LOP
Federally Supportable Plan
Fully Cost Shared
REACH 1
Open Channel
NED = 10-Yr LOP
LPP = 100-Yr LOP
REACH 2
Open Channel
NED = 10-Yr LOP
LPP = 100-Yr LOP
Ft Smith Levee
Existing "P" Street Storm Sewer
7th Street
7th Street
REACH 3
Open Channel
Recommended NED
Fully Cost Shared
"O" Street
N 18th Street
Short L Street
REACH 4
Open Channel
Recommended NED
Fully Cost Shared
Grand Avenue
800 cfs Limit
REACH 5 & 6
Open Channel
Betterment
Non-Federal Responsibility
Not Cost Shared
Park Avenue
N
May Branch Waiver Request
April 2005
Feet
0 500 1,000 2,000 3,000 4,000
Plate 4